

WHAT IS CLAIMED IS:

1. A tamper-evidencing closure comprising:
a top, a depending annular skirt and a tamper-evidencing band frangibly connected to said annular skirt;
said tamper-evidencing band including an inwardly turned retaining rim that extends at least partially upwardly, (said retaining rim having a free edge adapted for engagement with a locking surface of a closure;))
said retaining rim including a plurality of outwardly directed flutes spaced circumferentially thereon and a securing structure located on said retaining rim between said flutes.
2. The closure of claim 1, wherein said securing structure extends radially inwardly from said retaining rim.
3. The closure of claim 1, wherein said retaining rim extends inwardly as well as upwardly and is (sufficiently vertically oriented)
4. The closure of claim 1, wherein said securing structure includes a ratchet mechanism adapted to engage a neck of a container for providing one-way screwing of said closure relative to the neck.
5. The closure of claim 1, wherein said securing structure comprises a (locking mechanism adapted for preventing relative rotation between said closure and (a neck of a closure) in at least one direction.)
6. The combination of claim 5, wherein said locking mechanism is a first ratchet.

7. In combination, a container and a tamper-evidencing closure comprising:

a neck defining an opening in said container, a first securing structure on said neck spaced from said opening;

said tamper-evidencing closure including a top, a depending annular skirt and a tamper-evidencing band frangibly connected to said annular skirt;

said tamper-evidencing band including an inwardly turned retaining rim that extends at least partially upwardly, said retaining rim having a free edge for engagement with (said locking surface) as said closure is removed from said neck;

said retaining rim including a plurality of outwardly directed flutes spaced circumferentially thereon and a second securing structure located on said retaining rim between said flutes.

8. The combination of claim 7, wherein said second securing structure extends from said retaining rim toward said first securing structure for engagement with said first securing structure upon rotation of said closure relative to said neck in at least one direction.

9. The combination of claim 7, wherein said neck comprises a locking surface on said neck intermediate said first securing structure and said opening, said locking surface having a portion which is substantially horizontal when said container is upright.

10. The combination of claim 9, wherein said retaining rim extends inwardly as well as upwardly and is sufficiently vertically oriented so that said locking surface prevents movement of said retaining rim upon engagement of said free edge with said locking surface.

11. The combination of claim 9, wherein the distance between said locking surface and said opening is approximately equal to the distance between said free edge and said top, so that upon full mounting of said closure on said neck,

2025 RELEASE UNDER E.O. 14176

said retaining rim is positioned beneath said locking surface with said free edge proximal said locking surface.

12. The combination of claim 7, wherein one of said first and second securing structures includes a ratchet mechanism that engages the other of said first and second securing structures that provides for one-way screwing of said closure relative to said neck.

13. The combination of claim 7, wherein one of said first securing structure and said second securing structure comprises a first locking mechanism which prevents relative rotation between said closure and said neck in at least one direction.

14. The combination of claim 13, wherein said first locking mechanism is a first ratchet.

15. The combination of claim 13, wherein the other of said first securing structure and said second securing structure comprises a second locking mechanism that cooperates with said first securing structure and said second locking mechanism is a second ratchet.

16. The combination of claim 12, wherein the other of said first securing structure and said second securing structure comprises (a second locking mechanism that cooperates with (said first securing structure, said first locking mechanism is a first ratchet, and said second locking mechanism is a second ratchet cooperating with said first ratchet.

17. In combination,
a tamper-indicating closure, and

a container having a neck defining a neck opening and having a locking surface on the neck of the container spaced from the neck opening, the locking surface being substantially horizontally oriented when the container is upright,

the tamper-indicating closure including a top portion and a depending annular skirt for sealing the container neck and a tamper-indicating band connected to the lower edge of the annular skirt by means of a breakable connection;

the tamper-indicating band including tamper evidencing means including an inwardly turned retaining rim that extends at least partially upwardly, the retaining rim including a free edge that is adapted to engage the horizontally oriented locking surface of the container neck when the closure is removed from the container neck, the retaining rim including additional tamper evidencing means for use in indicating breakage of the seal formed by the top portion of the closure.

18. The combination of claim 17, wherein the retaining rim includes outwardly directed flutes.

19. The combination of claim 17, wherein the retaining rim extends inwardly as well as upwardly and is sufficiently vertically oriented so that engagement of the free edge of the retaining rim with the locking surface prevents upward movement of the retaining rim.

20. The combination of claim 19, wherein the spacing between locking surface and the neck opening is approximately equal to the spacing between the free edge of the retaining rim and the top portion of the closure, so that upon full mounting of the closure on the container neck, the retaining rim is positioned beneath the locking surface with the free edge of the retaining rim proximal the locking surface.

21. The combination of claim 17, wherein the breakable connection includes frangible elements, the retaining rim includes outwardly directed flutes to

prevent outward flexing of the retaining rim, and wherein some of the frangible elements are aligned vertically with the flutes.

22. The combination of claim 21, wherein the breakable connection includes a series of equally spaced frangible elements and the retaining rim includes a series of equally spaced flutes, and wherein each flute aligns vertically with a frangible connection.

23. The combination of claim 17, wherein the additional tamper evidencing means includes a ratchet mechanism that provides for one-way screwing of the closure cap onto the neck.

N 24. The combination of claim 21, wherein the ratchet mechanism includes a first set of ratchets with ramp surfaces that are aligned substantially horizontally so that the ramp surfaces face substantially downwardly and a second set of ratchets with ramp surfaces that are aligned substantially vertically.

25. The combination of claim 23 wherein, the ratchet mechanism includes ratchets on the retaining rim and ratchets on the neck that cooperate with the ratchets on the retaining rim.

26. The combination of claim 25, wherein the ratchets include ramp surfaces.

N 27. The combination of claim 26, wherein the ramp elements include ramp surfaces that are aligned substantially horizontally so that the ramp surfaces face substantially downwardly.

28. The combination of claim 26, wherein, the ramp surfaces are aligned at an angle so that they face slightly downwardly.

29. The combination of claim 28, wherein the ramp elements include tapered bottom edges adjacent the ramp surfaces.

30. A tamper-indicating closure for a container with a locking surface on the neck of the container, comprising:

a closure cap with a top portion and a depending annular skirt,

a tamper-indicating band connected to the lower edge of the annular skirt by means of a frangible connection,

the tamper-indicating band including an inwardly turned retaining rim that extends at least partially upwardly relative to the container neck, the retaining rim including a free edge that is adapted to engage the locking surface of the container neck,

(the free edge of the retaining rim including a locking surface engaging structure formed to ensure breakage of the frangible connection upon removal of the closure cap.)

31. The closure of claim 30; wherein the locking surface engaging structure includes an arcuate portion and at least one pleated portion

32. The closure of claim 30, wherein the locking surface engaging structure includes a plurality of arcuate portions, a plurality of pleated portions and a securing structure located between the pleated portions

33. The closure of claim 30, wherein the retaining rim includes at least one passageway formed and positioned to drain fluid from the enclosure.

34. The closure of claim 33, wherein the retaining rim is inwardly turned in a manner positioning an arcuate portion of its free edge underneath the locking surface of the container neck and the passageway is provide through the retaining rim.

35. The closure of claim 34, wherein the locking surface engaging structure includes a plurality of circumferentially spaced flutes in the retaining rim, and a plurality of circumferentially spaced passageways through the retaining rim with at least one passageway between each circumferentially adjacent pairs of flutes.

36. The closure of claim 35, wherein the retaining rim is inwardly turned at an angle that defines the free edge of the retaining rim with a diameter generally smaller than the diameter of the container neck.

37. The closure of claim 30, wherein the closure cap includes internal thread segments that are chord shaped and the locking surface engaging structure includes a securing structure.

38. The closure of claim 37, wherein the chord shaped thread segments have a wide diameter center and become progressively shallower toward their outer ends.

39. The closure of claim 38, wherein the chord shaped thread segments have a straight inner edge.

40. A closure cap for sealing the opening of a container having a threaded neck, comprising:
a top portion,
a downwardly depending skirt forming a cylindrical cap body, and
a thread pattern on the inner surface of the skirt, the thread pattern including thread segments that are chord shaped with a straight inner edge, and a passageway between the threaded pattern and an exterior of the cap for liquid drainage from the cap.

41. The closure of claim 40, wherein the thread segments are grouped with at least two thread segments aligned one above the other.

42. The closure of claim 41, wherein the aligned thread segments form gaps therebetween.

43. The closure cap of claim 40, wherein the chord shaped thread segments have a deeper center and progressively become shallower out toward their ends.

44. The closure of claim 43, wherein the thread segments are aligned with thread segments above and below.

45. The closure of claim 43, wherein the thread segments are aligned with the thread segments to either side, so as to form an intermittently defined thread groove.

46. A tamper-indicating closure for a container with a locking surface on the neck of the container, comprising:

a closure cap with a top portion and a depending annular skirt,

a tamper-indicating band connected to the lower edge of the annular skirt by means of a frangible connection,

the tamper-indicating band including an inwardly turned retaining rim the extends at least partially upwardly relative to the container neck, the retaining rim including a free edge that is adapted to engage the locking surface of the container neck,

the retaining rim including at least one passageway therethrough for drainage of liquid from the closure cap.

47. The closure of claim 46, wherein a free edge of the retaining rim includes a plurality of pleated portions, and at least one passageway through the retaining rim between each circumferentially adjacent pairs of pleated portions.